

IN THE CLAIMS:

Please amend claims 1, 30, 48 and 50 and cancel claims 51 and 52 as follows:

1 (Currently Amended): An electron-emitting device comprising:

an electron source layer made of one of a metal, a metal alloy and a semiconductor;

an insulating layer formed on said electron source layer, said insulating layer having at least one island region serving as an electron-emitting section in which film thickness of said insulating layer is gradually reduced;

a carbon region made of one of carbon and a carbon compound provided on at least one of ~~top~~, bottom and inside of said island region, the carbon region being disposed having a vacuum space directly over the carbon region; and

a metal thin film electrode formed on said insulating layer,

wherein the electron source layer directly interfaces the carbon region at a center of the island region with the electron source layer facing the vacuum space via the carbon region at the center of the island region,

~~wherein electrons are emitted upon application of an electric field between said electron source layer and said metal thin film electrode, wherein a mask is used to form said metal thin film electrode such that said metal thin film electrode terminates on said insulating layer within said island region and is completely absent in a central region having been masked.~~

2 (Original): An electron-emitting device as claimed in claim 1 wherein said metal thin film electrode and said carbon region are deposited by one of a physical deposition method and a

chemical deposition method.

3 (Original): An electron-emitting device as claimed in claim 1 wherein said carbon region is a thin film deposited on one of said island region and said metal thin film electrode.

4 (Original): An electron-emitting device as claimed in claim 1 wherein said carbon region is a thin film deposited on said island region while a voltage is being applied between said electron source layer and said metal thin film electrode.

5 (Original): An electron-emitting device as claimed in claim 4 wherein said applied voltage is supplied intermittently according to a voltage application period in which the voltage rises and falls.

6 (Withdrawn): An electron-emitting device as claimed in claim 1 wherein said carbon region is distributed within said metal thin film electrode.

7 (Original): An electron-emitting device as claimed in claim 1 wherein said carbon region is a thin film deposited under said metal thin film electrode.

8 (Withdrawn): An electron-emitting device as claimed in claim 1 wherein said carbon region is a thin film deposited under said insulating layer.

9 (Original): An electron-emitting device as claimed in claim 1 wherein the thickness of said metal thin film is gradually reduced in conjunction with said insulating layer.

10 (Original): An electron-emitting device as claimed in claim 1 wherein the thickness of said carbon region is gradually reduced in conjunction with said insulating layer.

11 (Original): An electron-emitting device as claimed in claim 1 wherein said insulating layer is made of a dielectric material and has a thickness of at least 50 nm in areas other than said island region.

12 (Previously Presented): An electron-emitting device as claimed in claim 1 wherein said metal thin film electrode terminates on said insulating layer in a manner such that a thickness thereof is gradually reduced within said island region.

13 (Original): An electron-emitting device as claimed in claim 1 wherein said insulating layer terminates on said electron source layer within said island region.

14 (Original): An electron-emitting device as claimed in claim 1 wherein said island region is a recess on a flat surface of said metal thin film electrode and said insulating layer.

15 (Withdrawn): An electron-emitting device as claimed in claim 1 further comprising a fine particle within said island region.

16 (Withdrawn): An electron-emitting device as claimed in claim 1 further comprising, within said island region, a reverse-tapered block projecting in a direction normal to said substrate and at a top portion thereof, includes an overhang projecting in a direction parallel to said substrate.

Claims 17-29 (Canceled).

30 (Currently Amended): A display apparatus comprising;
a first substrate and a second substrate facing each other with a vacuum space therebetween;
a plurality of electron-emitting devices provided on said first substrate;
a collector electrode provided on an interior surface of said second substrate; and
a phosphor layer formed on said collector electrode; wherein each of said electron-emitting devices comprises

an electron source layer made of one of a metal, a metal alloy and a semiconductor formed on an ohmic electrode,

an insulating layer formed on said electron source layer and having at least one island region serving as an electron-emitting section in which film thickness of said insulating layer is reduced,

a metal thin film electrode formed on said insulating layer, ~~said insulating layer having at least one island region constituting an electron emitting section in which the film thickness of said insulating layer is gradually reduced,~~ and

a carbon region made of one of carbon and a carbon compound is provided on at least one of a top, bottom and inside of said island region, the carbon region being disposed having a vacuum space directly over the carbon region, wherein the electron source layer directly interfaces the carbon region at a center of the island region with the electron source layer facing the vacuum space via the carbon region at the center of the island region a mask is used to form said metal thin film electrode such that said metal thin film electrode terminates on said insulating layer within said island region and is completely absent in a central region having been masked.

31 (Original): A display apparatus as claimed in claim 30 wherein said insulating layer, said metal thin film electrode and said carbon region are deposited by one of a physical deposition method and a chemical deposition method.

32 (Original): A display apparatus as claimed in claim 30 wherein said carbon region is a thin film deposited on one of said island region and said metal thin film electrode.

33 (Original): A display apparatus as claimed in claim 30 wherein said carbon region is a thin film deposited on said island region while a voltage is being applied between said electron source layer and said metal thin film electrode.

34 (Original): A display apparatus as claimed in claim 30 wherein said applied voltage is supplied intermittently according to a voltage application period in which the voltage rises and falls.

35 (Withdrawn): A display apparatus as claimed in claim 30 wherein said carbon region is distributed within said metal thin film electrode.

36 (Original): A display apparatus as claimed in claim 30 wherein said carbon region is a thin film deposited under said metal thin film electrode.

37 (Withdrawn): A display apparatus as claimed in claim 30 wherein said carbon region is a thin film deposited under said insulating layer.

38 (Original): A display apparatus as claimed in claim 30 wherein the thickness of said metal thin film electrode is gradually reduced in conjunction with said insulating layer.

39 (Previously Presented): A display apparatus as claimed in claim 30 wherein the thickness of said carbon region is gradually reduced in conjunction with said insulating layer.

40 (Original): A display apparatus as claimed in claim 30 wherein said insulating layer is made of a dielectric material and has a film thickness of at least 50 nm in areas other than said island region.

41 (Previously Presented): A display apparatus as claimed in claim 30 wherein said metal thin film electrode terminates on said insulating layer in a manner such that a thickness thereof is gradually reduced within said island region.

42 (Original): A display apparatus as claimed in claim 30 wherein said insulating layer terminates on said electron source layer within said island region.

43 (Original): A display apparatus as claimed in claim 30 wherein said island region is a recess on a flat surface of said metal thin film electrode and said insulating layer.

44 (Withdrawn): A display apparatus as claimed in claim 30 further comprising a fine particle within said island region.

45 (Withdrawn): A display apparatus as claimed in claim 30 further comprising, within said island region, a reverse-tapered block which projects outwardly in a direction normal to said substrate and has an overhang in a top portion thereof, projecting in a direction parallel to said substrate.

46 (Withdrawn): A display apparatus as claimed in claim 30 wherein bus lines are formed over a plurality of said metal thin film electrodes, and said ohmic electrodes and said bus lines are electrodes, each having a shape of a strip, and arranged orthogonal to each other.

47 (Previously Presented): An electron-emitting device as claimed in claim 1, wherein said island region defines a curved concave recess, the entire concave recess being semi-spherical in shape.

48 (Currently Amended): An electron-emitting device as claimed in claim 1, wherein film thickness of said insulating layer is gradually reduced and at least one of said carbon region and said metal thin film electrode has a film thickness that is gradually reduced to a thickness of zero in the island region.

49 (Previously Presented): A display as claimed in claim 30, wherein said island region defines a curved concave recess, the entire concave recess being semi-spherical in shape.

50 (Currently Amended): A display as claimed in claim 30, wherein film thickness of said insulating layer is gradually reduced and at least one of said carbon region and said metal thin film electrode has a film thickness that is gradually reduced to a thickness of zero in the island region.

Claims 51-52 (Canceled).